production under discussion. Coating roller speed is 207 rpm and fluidity is 90 liters/hour. FIG. **5** shows graphically the relationship between paper tension and the wet weight of the gypsum in the subject 1.27 cm (½ inch) gypsum board production under discussion.

| | | Parameter varied: | PAPER TENSION Roller | |
|---|---|---|---|---|
| | | Constants: | R.P.M.: 207 | |
| | | | Fluidity: 90 l/hr | |
| | | Deposited layer data | | |
| Tension | | Wet Wt | Dry Wt | Dry thickness |
| lbs | pli | gms/ft$^2$ | gms/ft$^2$ | Layer (thou) | Ridge (thou) |
| 50 | 0.99 | 123 | 76.2 | 33 | 107 |
| 60 | 1.19 | 103 | 64.1 | 32 | 90 |
| 80 | 1.79 | 73.3 | 46.8 | 25 | 82 |
| 100 | 1.99 | 59.5 | 37.4 | 24 | 80 |
| 120 | 2.39 | 52.1 | 33.3 | 21 | 70 |
| 140 | 2.79 | 48.8 | 31 | 20 | 50 |
| 160 | 3.18 | 41.2 | 26.4 | 19 | 40 |

The following table shows the effect of varying the coating roller-speed in the example 1.27 cm (½ inch) gypsum board production under discussion. Paper tension 2.587 pounds/linear inch (0.5 kg/cm) and fluidity is 90 liters/hours. Again, FIG. **6** shows graphically the relationship between coating roller speed and the wet weight of the gypsum in the example under discussion.

| | Parameter varied: | ROLLER R.P.M. | |
|---|---|---|---|
| | Constants: | Tension: 2.587 pli | |
| | | Fluidity: 90 l/hr | |
| | Deposited Layer Data | | |
| | Wet Wt | Dry Wt | Dry thickness |
| R.P.M. | gms/ft$^2$ | gms/ft$^2$ | Layer (thou) | Ridge (thou) |
| 42 | 17.7 | 10.7 | 18 | 30 |
| 80 | 26 | 16 | 21 | 38 |
| 140 | 30 | 18 | 18 | 40 |
| 210 | 33 | 20.2 | 20 | 40 |
| 258 | 41.3 | 25.9 | 20 | 50 |
| 300 | 54.1 | 33.8 | 20 | 50 |

From the above, thus, it will be apparent that all three of the parameters, spreader roller speed, sheet tension and high density slurry viscosity are inter-related and can be adjusted within predetermined limits to give the desired high density coating thickness and prevent the high density gypsum from building up on the coating roller. Alternatively, one or more of the parameters can be held constant and the other parameters varied to prevent the high density gypsum from building up on the spreader roller.

Having described preferred embodiments of the invention, it will be appreciated the various modifications may be made to the apparatus and methods described above. For example, gypsum board could be made with only a single facing sheet **22** by eliminating cover sheet **64** and its associated coating apparatus. Although gypsum board production has been described as a preferred product to be produced by gypsum board machine **10**, other types of board could be produced on this apparatus. Other cementitious materials could be used for the core layer and other bond promoting materials could be used between the core layer and the facing sheet, such as various adhesives. Other devices can be used to tension the facing and cover sheets, such as applying braking devices to supply rolls **24** and **66**, or varying the speed of conveyor rollers **28** while keeping the input speed of the facing and cover sheets constant. A table with a gap could be used with coating roller **72**, and table rollers **70** could be used on either side of coating roller **30**. For the purposes of this disclosure, the term "table having an upper surface and a transverse gap therein" is intended to include an arrangement such as table rollers **70**, and the like.

As will be apparent to those skilled in the art in the light of the foregoing disclosure, many alterations and modifications are possible in the practice of this invention without departing from the spirit or scope thereof. Accordingly, the scope of the invention is to be construed in accordance with the substance defined by the following claims.

What is claimed is:

**1**. Apparatus for producing gypsum board, comprising:

an elongate table having an upper surface for supporting a continuously moving facing sheet thereon, the table having a transverse gap therein dividing the table into an upstream portion and a downstream portion;

a transverse spreader roller located parallel to said upper surface and having an outer surface extending partially into said gap for depressing said facing sheet below the table upper surface;

means for applying longitudinal tension to the facing sheet to control the pressure of the facing sheet against the spreader roller, there being nothing under the facing sheet to press the facing sheet into engagement with the spreader roller;

drive means for rotating the spreader roller outer surface in the same direction as the facing sheet;

means for depositing a coating slurry onto the facing sheet on the upstream portion of the table, the coating slurry being spread over the facing sheet by the spreader roller; and

means for applying a core slurry onto the facing sheet on the downstream portion of the table on top of the coating slurry.

**2**. Apparatus as claimed in claim **1** wherein the drive means for rotating the spreader roller is a variable speed drive adapted to rotate the spreader roller between predetermined minimum and maximum speeds, each of said speeds being such that the surface speed of the spreader roller can be faster than the speed of travel of the facing sheet.

**3**. Apparatus as claimed in claim **2** wherein the predetermined minimum and maximum speeds can be between 1.2 and 3.5 times the speed of travel of the facing sheet.

**4**. Apparatus as claimed in claim **1** wherein the means for applying longitudinal tension to the facing sheet includes a transverse, adjustable tension bar located parallel to and bearing against the facing sheet to exert a drag force on the facing sheet.

**5**. Apparatus as claimed in claim **4** wherein the means for applying longitudinal tension to the facing sheet furthers includes conveyor means located downstream of the table for pulling the gypsum board from the table at a predetermined speed.

**6**. Apparatus as claimed in claim **5** wherein the length of the spreader roller is less than the width of the facing sheet, and further comprising end scrapers bearing against opposed ends of the spreader roller to keep said ends clean in the event that coating slurry passes around the ends of the spreader roller.